Drew Technologies, Inc.

DashDAQ XL

Instruction Manual

Dear Customer,

Congratulations! You have just purchased the most powerful, sophisticated, and easy to use automotive data logger ever created. The DashDAQ XL gives everyone access to the powerful information embedded in their vehicle. When it comes to automotive performance, knowledge is horsepower.

The DashDAQ XL works with any OBD II vehicle. It can also be fitted to any other vehicle using optional add-ons. Now you have a device that captures information on your new vehicle as well as your vintage one.

This is an exciting time for vehicle performance, and the more you know about your vehicle the more you can get out of it. The DashDAQ gives automotive enthusiasts the edge in knowing their vehicle, new or old.

Drew Technologies would like to thank you on your decision to buy the DashDAQ XL. However you use your DashDAQ, we know you will be satisfied with all aspects of the product. You demand the best, we deliver the best.

Thank You,

Drew Technologies, Inc.

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IMPORTANT!

THIS IS A HIGH PERFORMANCE PRODUCT, USE AT YOUR OWN RISK

Do not use this product until you have carefully read the following terms and conditions for the use of this product. The installation of this product indicates the BUYER has read and understands this agreement and accepts its terms and conditions. This agreement takes precedence.

DISCLAIMER OF LIABILITY

Drew Technologies and its successors, distributors, jobbers, and dealers (hereafter SELLER) shall in no way be responsible for the product's proper use and serviceability.

THE BUYER HEREBY WAIVES ALL LIABILITY CLAIMS.

The BUYER acknowledges that he/she is not relying on the SELLER's skill or judgment to select or furnish goods suitable for any particular purpose and that there are no liabilities which extend beyond the description on the face hereof and the BUYER hereby waives all remedies or liabilities, expressed or implied, arising by law or otherwise, (including without any obligations of the SELLER with respect to fitness, merchantability, and consequential damages) or whether or not occasioned by the SELLER's negligence. The SELLER disclaims any warranty and expressly disclaims any liability for personal injury or damages. The BUYER acknowledges and agrees that the disclaimer of any liability for person injury is a material term for this agreement and the BUYER agrees to indemnify the SELLER and to hold the SELLER harmless from any claim related to the item of the equipment purchased. Under no circumstances will the SELLER be liable for damages or expenses by reason of use or sale of any such equipment. The SELLER assumes no liability regarding the improper installation or misapplication of its products. It is the installer's responsibility to check for proper installation and if in doubt, contact the manufacturer.

IN THE EVENT THAT THE BUYER DOES NOT AGREE WITH THIS AGREEMENT: THE BUYER MAY PROMPTLY RETURN THIS PRODUCT, IN A NEW AND UNUSED CONDITION, WITH A DATED PROOF OF PURCHASE, TO THE PLACE OF PURCHASE FOR A FULL REFUND. THE INSTALLATION OF THIS PRODUCT INDICATES THAT THE BUYER HAS READ AND UNDERSTANDS THIS AGREEMENT AND ACCEPTS ITS TERMS AND CONDITIONS.

Warning: Minnesota and California state laws restrict the method of attachment and placement of objects to the windshield and side windows of motor vehicles (See Minnesota Statutes 2005, Section 169.71 and California Vehicle Code Section 26708(a)). Drew Technologies does not take any responsibility for any fines, penalties, or damages that may be incurred as a result of disregarding the laws and statutes of the jurisdictions in which a DashDAQ is operated.

Similar laws may apply within your province or state. Please verify your provincial or state laws prior to installation.

Warning: When mounting the DashDAQ to the windshield, place the device in a location where it does not obstruct the driver's view of the road and does not interfere with vehicle controls and safety devices or the safe operation of the vehicle.

Attention: Onstar subscribers may notice an interruption in Onstar diagnostic services while using OBD II scan tool devices, including DashDAQ. Normal operation will resume once the device has been removed from the OBD II port.

Components

Included with DashDAQ

Display Unit

Software CD

Windshield Mount with four screws

USB Cable

OBD II Cable

Optional DashDAQ Accessories

Accessory Cable

SD Memory Card.

110V Power Supply

CAN Expansion Cable

GPS Receiver

INSTALLATION

SAFETY FIRST!

Install DashDAQ in such a manner that it does not interfere with the safe operation of the vehicle. If DashDAQ cannot be mounted in such a manner, promptly return the DashDAQ to Drew Technologies or your purchasing location. Visit www.dashdaq.com to see Drew Technologies return/refund policy.

OBD II CONNECTOR

The OBD II, or "data link," connector is necessary for DashDAQ operation in OBD II vehicles. Power and all vehicle information come directly from this vehicle link.

Most OBD II connectors are found directly below the steering column. If you cannot find the OBD II connector, a local mechanic should be able to assist you.

*Vehicles not equipped with OBD II may require additional hardware. See Device Manager/Third Party Accessories (pg 17) for more info.

CABLE ROUTING

The DashDAQ OBD II cable must be routed so that it does not interfere with safe operation of the vehicle.

Cable routing tips:

- Find the OBD II connector first and work the cable to where DashDAQ is to be mounted on the windshield.
- Route the DashDAQ OBD II cable between interior panel grooves to hold the cable as well as conceal it.
- Use wire or zip ties to bundle any excess cable.

Cable routing "Don'ts"

- Don't let the cable dangle by your feet.
- Don't let the cable hang free.
- Keep the cable away from the steering wheel and any steering column controls.

ATTACHING WINDSHIELD MOUNT

1. Remove these two items from packaging:
    a. Display Unit
    b. Windshield Mount
2. Line up the four holes on the windshield mount and thread each of the four screws into the display unit.
3. Using a Phillips head screwdriver, lightly tighten each of the four screws. Note: Over tightening can cause the mount to crack.

Attaching the windshield mount to DashDAQ

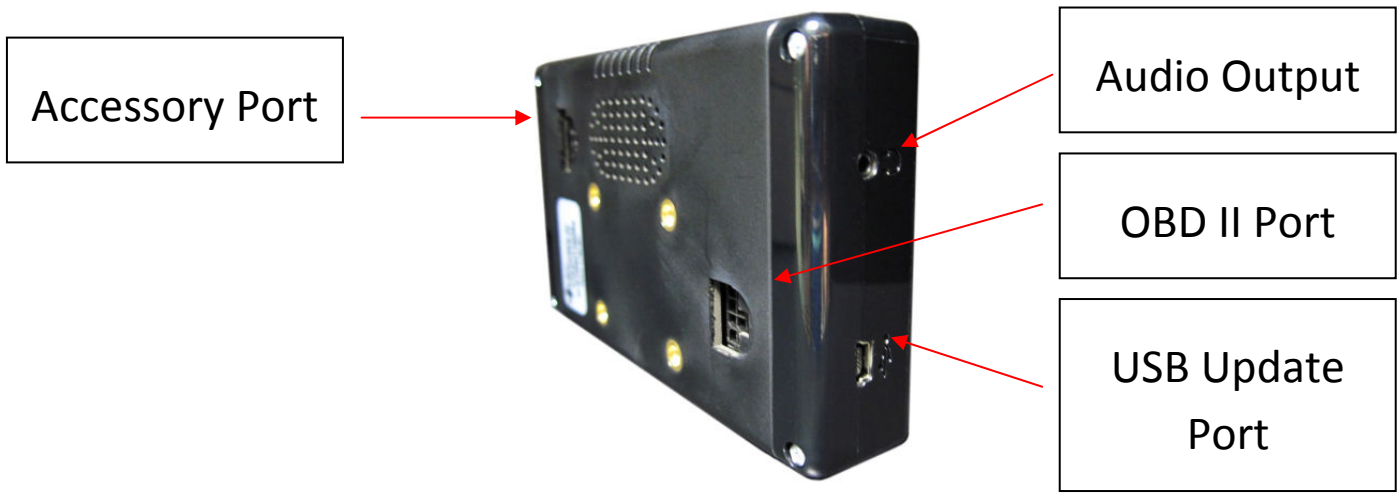
WINDSHIELD MOUNTING

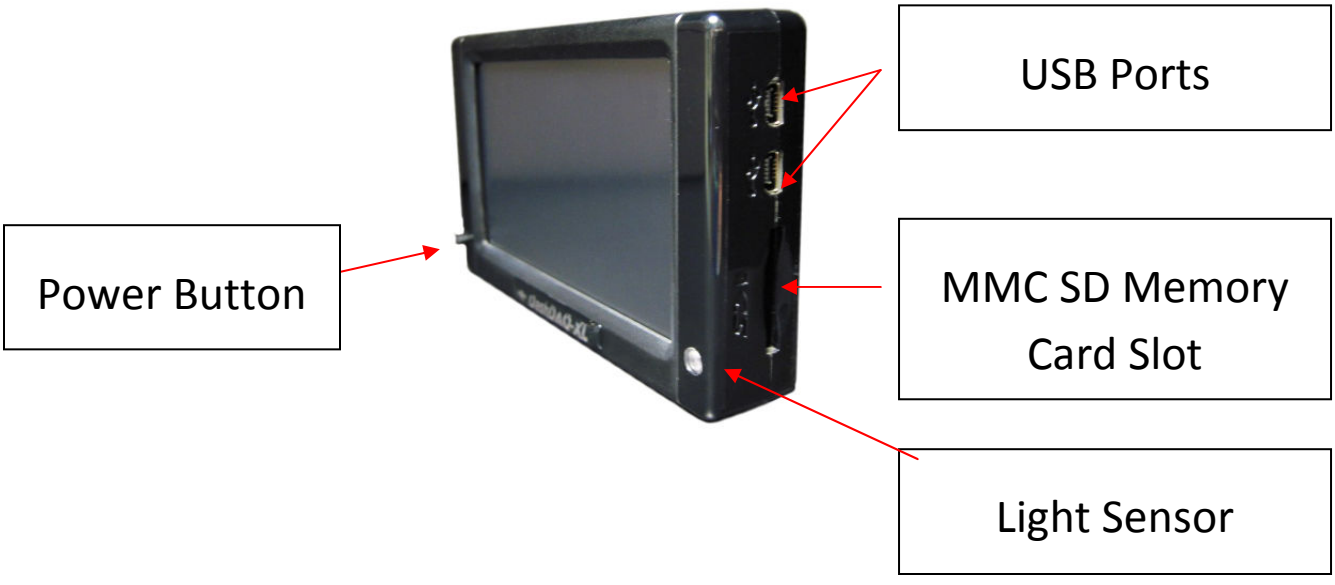
Mount the DashDAQ on the windshield in a spot that does not obstruct the view of the road or in any way that interferes with the safe operation of the vehicle.

Mounting Suggestions:

- Mount the DashDAQ as low to the dashboard as possible.
- Mounting to the left or in the middle works well.

CONNECTIONS





SD MEMORY CARD

Always insert and remove the memory card with the DashDAQ powered off. Insert the card with the gold connections facing towards the screen. Press the card into the DashDAQ until a click is heard. If the card sticks out at all, it has not been pushed in all the way.

To remove, press the card in until a click is heard. Release and the card will eject enough to grab it.

BASIC OPERATION

MENU NAVIGATION

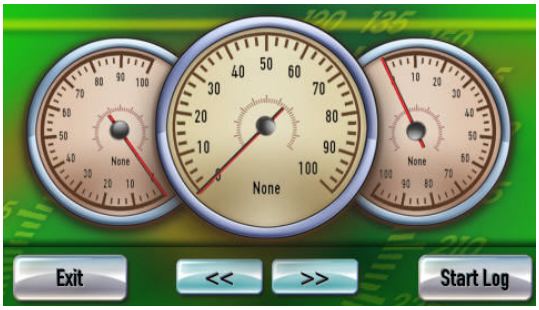
When DashDAQ first starts up, a boot screen will appear. Start will take a few moments to start up.

When this warning screen appears, please read carefully.

WARNING
If you use the DashDAQ in your vehicle you are responsible for positioning and using it so that the driver's visibility is not obstructed and the operation of the vehicle and its safety systems are not hindered, and so as to avoid ANY risk of accident, injury and/or damage. You must obey road safety rules and only handle the DashDAQ when the vehicle is stationary and safe from other traffic. Drew Technologies and/or its suppliers shall not be liable for any use of this product that may cause accidents or damage or that break the law or for any direct or indirect consequences thereof.
I Accept

To continue, tap the [I Accept] button. If you do not agree to abide by the warning, please disconnect DashDAQ and contact Drew Technologies for a return authorization.

Tapping the [I Accept] button will bring up the gauge screen:



The [<<] and [>>] arrow buttons at the bottom are used to cycle through different gauge layouts.

The [Exit] button in the lower left corner returns the screen to the main menu for accessing all of DashDAQ's features.

NEW VEHICLE SETUP/FIND SIGNALS

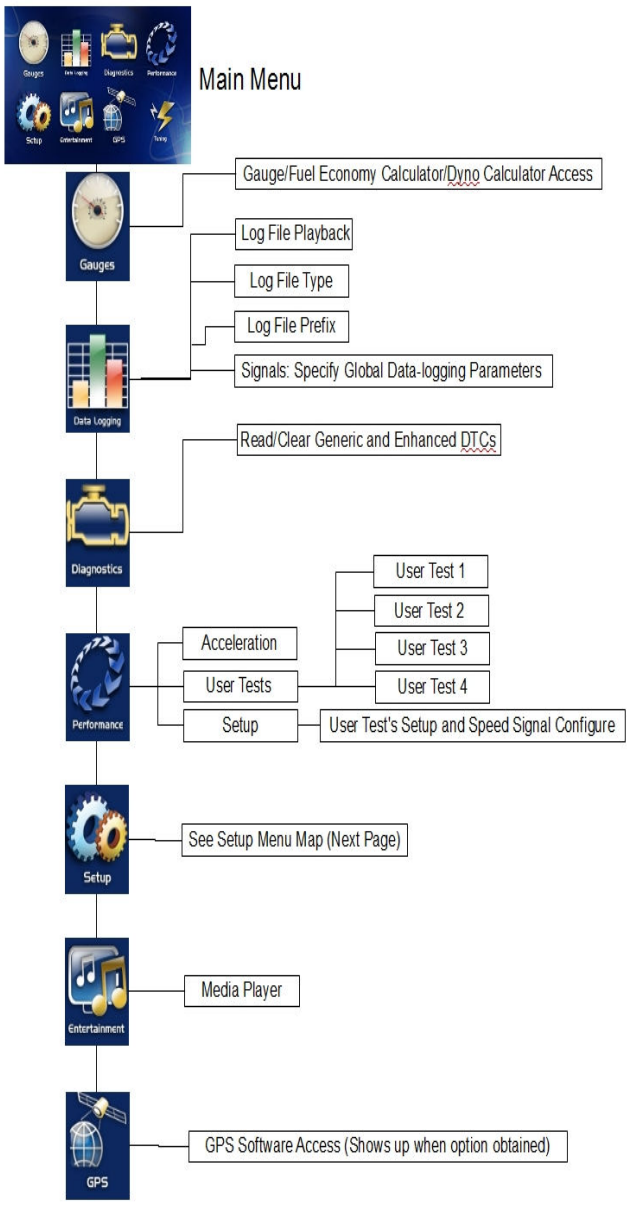
The DashDAQ has been designed to be used on any 1996 and newer OBD II vehicle. Vehicles, which the DashDAQ is connected, will typically offer a different set of parameters or signals available.

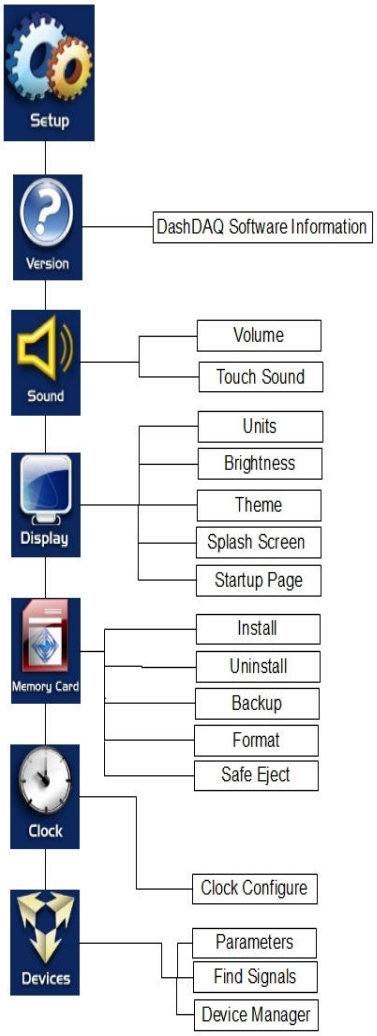
The New Vehicle setup:

1. Plug DashDAQ into the vehicle.
2. Turn the vehicle's key to the on position. The engine does not need to be started.
3. Turn on the DashDAQ.
4. From the DashDAQ main menu, Tap [Setup], tap [Devices].
5. Tap [Find Signals].
6. Follow the on-screen instructions. When DashDAQ lists how many signals were found, DashDAQ has finished.
7. Repeat steps 1-6 every time DashDAQ is connected to a new vehicle.

*Signals may appear and not function if the New Vehicle Setup is not run when the DashDAQ is connected to a different vehicle

MAIN MENU AND SETUP MENU



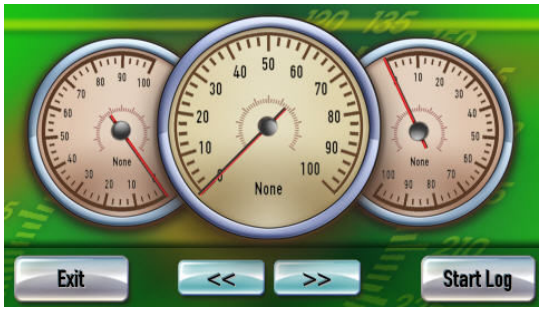


GAUGE SETUP & NAVIGATION

DashDAQ offers the ability to monitor hundreds of vehicle sensors for real time display and data logging. Data sample rates will vary by vehicle. This rate is a fixed amount and the total of active signal being monitored and logged will share this sample rate.

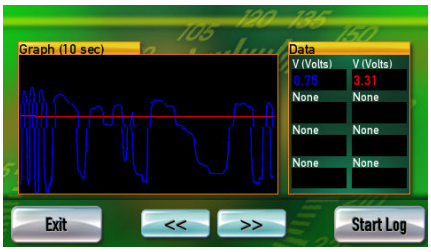
NAVIGATING GAUGES

From the Main Menu tap [Gauges].



Layout with 3 round gauges

Tap on the [<<] and [>>] buttons to view other gauge layout options. Two gauge layout examples:



Layout for graphing up to 8 signals

Layout for displaying up to 9 numeric signals

ASSIGN A SIGNAL TO A GAUGE

Be sure the New Vehicle Setup (pg 11) has been completed before assigning signals to a gauge.

1. Tap on the gauge region where the signal will be displayed. This screen will appear:

Assign signal screen

2. Tap on [Signal] area in the black region.
3. Use the [<] or [>] at the top to select the Data group you wish to select your signals from.
4. Use the scroll bar to the right to locate and select the signal you wish to monitor.
5. Tap [Save].

SET GAUGE MIN/MAX VALUES-OPTIONAL

Tap on the [Low Limit] button to set the bottom value for the signal.

Tap on the [High Limit] button to set the top value for the signal.

1. Tap [Low Limit] or [High Limit] will bring up this screen:

Entering maximum value for a gauge

2. Type in the desired value.
3. To make the value negative tap [+/-].
4. Tap [save]
5. Repeat steps 1-4 to set the signal's minimum value.

SET GAUGE LOW WARNING / HIGH WARNING-OPTIONAL

You can also create an upper and lower "redline" region on the DashDAQ. The below gauge has a "redline danger zone" between 5000 and 6000 RPM.

To set a High/Low Warning:

1. Tap on the gauge where a High/Low Warning is to be set.
2. On the Assign Signal screen, tap on [High Warning] or [Low Warning].
3. Type in the desired upper or lower warning level number. Tap [+/-] to make the value negative.
4. Tap [Save].
5. Tap [Save] on the Assign Signal screen to go back to the gauges.

Round gauge with a high limit warning

WARNING SOUNDS- OPTIONAL

DashDAQ can also play a pre-installed or user defined audible warning when a signal has entered the upper or lower warning area.

To set a Warning Sound:

1. Tap on a gauge that you want the warning sound to be apparent on.
2. Tap on the crossed out speaker for either the High or Low warning.
3. Tap on the black box next to “Sound” to select the audio clip to be played when the threshold is crossed.

High Warning sound set for RPM warning.

4. The repeat rate is how often the sound will repeat while the threshold is crossed. 0 will repeat constantly.
5. The “State” field will either enable or disable the warning. Tap [Save].
6. Make sure your warning threshold for the high or low warning that you use is set, and make sure your signal for the gauge is specified.

To upload your own sounds:

1. Sound files must have these attributes:

Extension:	.wav
Encoding:	PCM (uncompressed)
Size:	8 or 16 bit signed integer
Sample Rate:	22050, 11025, 5512 or 5513 KHZ
Channels:	Stereo or Mono
Length:	Less than 10 seconds

2. Create a folder on your SD called named “Transfer,” and place file inside folder.
3. Insert the SD into the DashDAQ, and turn the unit on.
4. From the Main Menu tap on [Setup], then [Memory Card], then [Install], then [Sound].
5. Select which sound you wish to install and tap [Install].

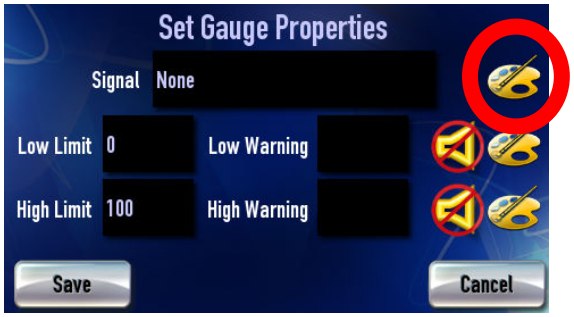
You can now specify this warning sound for any High or Low warning in the gauges.

SETTING SIGNAL/GRAPH COLORS- OPTIONAL

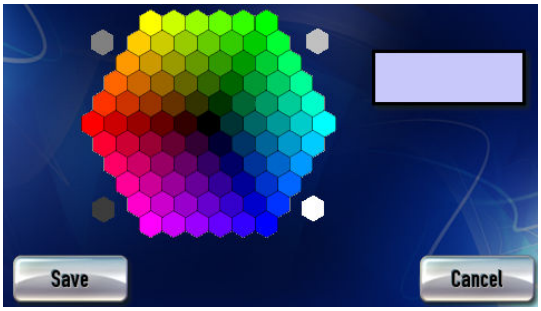
Setting different colors for a gauge makes it easier to see, and is especially helpful on the graphing gauge.

To change a gauge's color:

1. color palette in the corner of the box.
2. Tap on a color to select it. Tap [Save].
3. Tap [Save] to return to the gauges.



Button to change gauge color



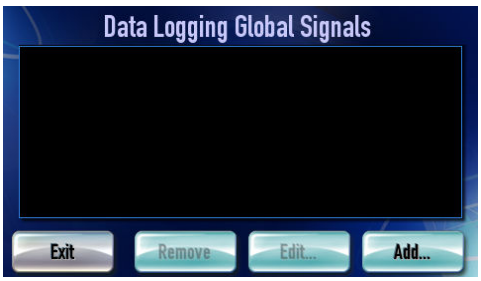
Color selection screen

You will now be able to monitor the sensor activity on that gauge. Repeat the above steps to fill in the remaining gauges. Use the [<<] or [>>] buttons on the gauge screen to view other gauge sets. Only the active gauge screen signals will be monitored and logged.

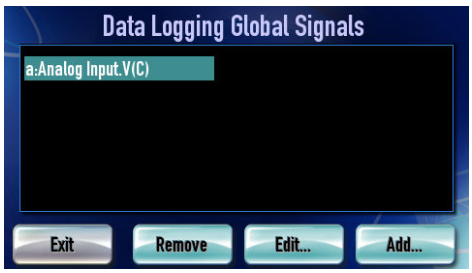
GLOBAL DATA LOGGER

DashDAQ will monitor and log all signals shown on the active gauge screen. It is also possible to monitor signals not shown on the active gauge screen. This allows the user to view only the most valuable data, while still being able to review all the vehicle data in the log file. The Global Data Logger can silently monitor up to 16 signals and will be logged with the active gauge screen data.

1. Tap on [Data Logging] from the Main Menu.
2. Tap on [Signals].
3. Tap on [Add]. Then [Assign Signal].
4. Select you signal, then tap [Save]. Tap [Save] once more.



Global Data Logging Screen



After adding a signal for global datalogging

DEVICE MANAGER/THIRD PARTY ACCESSORIES*

Besides Generic OBD II data, the DashDAQ offers a wide range of enhanced data and third party sensor devices that help improve the quality and quantity of data you are able to monitor and log. These drivers and licenses can be purchased on the original purchase or anytime thereafter. These add-ons may require additional software or hardware for full functionality.

OEM Extended/Enhanced drivers:

- GM vehicles
- Ford vehicles
- Chrysler (LX platform vehicles tested)
- Subaru Vehicles
- Hyundai/Kia
- Mitsubishi
- Toyota
- Chevy Volt

Third Party devices can be used to expand and improve the quality of data you are able to pull from the vehicle. These devices will give you guaranteed data availability that can not be found in OBD II.

Third Party Accessory Drivers:

EFI Systems
AEM Plug-N-Play EMS
AEM Universal EMS
Autronic SM2 (1.08 and newer)
Autronic SM4 (1.08 and newer)
DTAFast S40 Pro
DTAFast S60 Pro
DTAFast S80 Pro
DTAFast S100 Pro
EFI Technologies
Emerald 3D ECU
EMS 4860
EMS 6860
EMS 8860
EMS Stinger 4
Fast XFI
Haltech E11V2
Haltech E6GMX
Haltech E8
Haltech Interceptor
Haltech Platinum Sport
HydraEMS Nemesis 2
Link ECU
Wolf EMS

GPS Inputs
Blackline FUEL 10 Hz
Blackline FUEL 20 Hz
1 Hz GPS USB Sensor

Wideband (AFR) Sensors

AEM Wideband Uego
FAST Air/Fuel Meter
FJO Wideband
NGK Wideband Kit
PLX Wideband
Dynojet WBC Wideband

EGT and Thermocouple Sensors
Phidgets USB K-type thermocouple and EGT

Miscellaneous
0-5v Analog Sensors
J1939 Heavy Duty Trucks

Multi-Signal Collection Devices
Innovate DL-32
Innovate SSI-4
Innovate TC-4
Innovate LMA-3
Innovate LC-1
Innovate LM-1
Phidgets 8/8/8 USB Analog in
Phidgets 0/16/16 USB Digital in
Zeitronix ZT-2

LICENSED DASHDAQ DRIVERS

Some third party devices require the purchase of a licensed driver in order to provide full operation with the DashDAQ. These licenses can be purchased online at, www.dashdaq.com, or by calling Drew Technologies. Licenses can be purchased at the time of purchase or any time thereafter.

Licenses are assigned to the DashDAQ, based on the DashDAQ serial number, and can not be refunded or transferred.

A license purchased after the original DashDAQ purchase, can be added to the DashDAQ using the DashDAQ Recovery tool. An email will be sent alerting you when you can update your device with the new license.

Follow the Updating DashDAQ instructions below for further instructions.

USING DEVICE MANAGER

The DashDAQ Device Manager is where the various pre-installed and licensed drivers and non-OBD II inputs can be added or removed for use with the DashDAQ.

From the Main Menu tap on [Setup], then [Devices], then [Manager].

Device manager screen

Selecting the next available slot

Notice that there are lettered ports labeled from A-H. These are ports are where the active drivers are specified.

To add a driver/input:

1. Select an unused port and tap [Add Device]
2. Using the [<] or [>] locate and select the driver you wish to install. Then tap [install].
3. Next select which port the input is located on. You can only have 1 item per port type.
4. If you receive an error of port in use you may need to switch port types or remove an incompatible driver from the device manager.

Now your device will be installed in the slot you specified. All installed devices can be assigned to any gauge.

To remove a driver/input:

1. Select the Driver/Input and tap [remove].

Removing the driver/input does NOT delete the driver/input from the DashDAQ. You can always add it back in the future.

ADDING SUPPORT FOR ENHANCED OBD II DATA

Enhanced data purchased with the DashDAQ will be pre-installed when you receive your DashDAQ. If you purchase the enhanced license after the original purchase or wish to change the driver you may use the DashDAQ recovery tool to update the DashDAQ to include the purchased driver into the available device driver list. Check out the "Updating DashDAQ" section for more details.

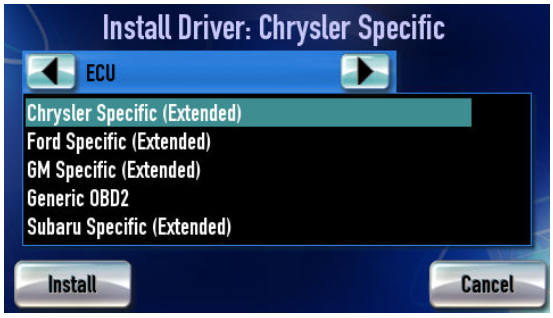
If a user buys a Chrysler Enhanced driver for example:

1. The user purchases the add-on at www.dashdaq.com and then waits for confirmation of driver purchase from Drew Tech.
2. Next the user runs the update tool and selects the appropriate drivers.
3. Lastly the driver is available in the DashDAQ Device Manager driver lists.

To install an Enhanced Driver:

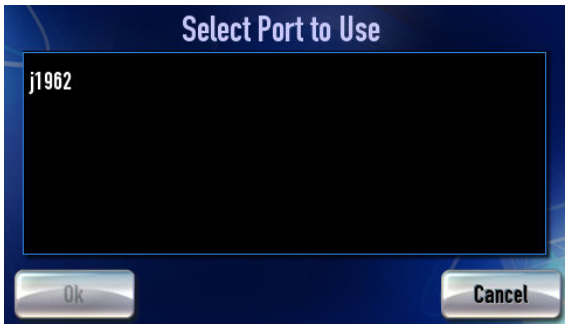
1. Select an unused port and tap [Add Device].

Tap [Driver] to choose and install a new driver

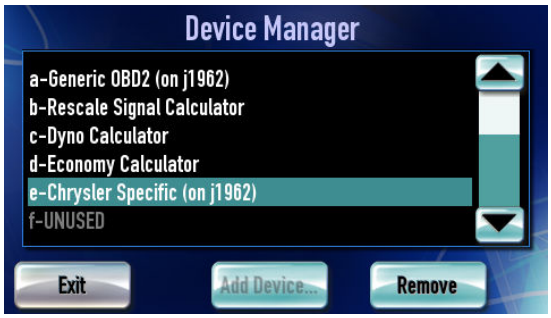


Select the driver for Chrysler enhanced OBD II data

2. Locate and select the enhanced driver you wish to install under the "ECU" screen. Tap [Install].
3. Select [j1962] and then tap [OK].



Tap [Save] to confirm the device installation



New signals will be available on E-ChryslerSpecific

Now that we see the Chrysler Specific driver populated in slot [E], we will now be able to view the Chrysler specific parameters on any gauge after we run "Find Signals" again.

**If you receive an error of port in use you may need to switch port types or remove an incompatible driver from the device manager. Some Enhanced data can not be used when Generic OBD or other Enhanced Data driver are installed in the Device Manager.

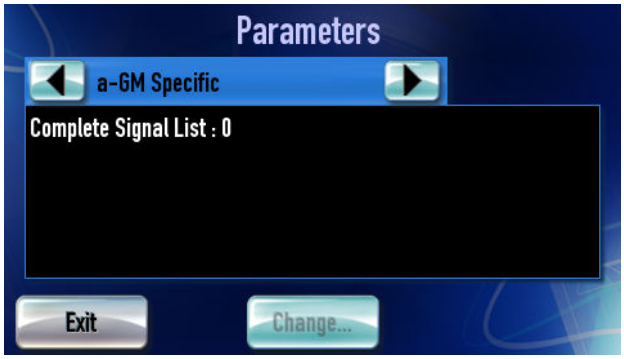
ADJUSTING DRIVER PARAMETERS

The Parameters menu is used to customize how data is displayed on the DashDAQ. For example, changing the units to metric, to change signal scaling, and other options.

1. From the main menu, tap on [Setup]
2. Tap on [Devices]
3. Tap on [Parameters]

Enhanced Drivers can also be modified through the Parameters screen so that more or less parameters are searched for through "Find Signals." Each enhanced driver for each manufacturer has thousands of parameters. We organized these parameters into a scale of usefulness:

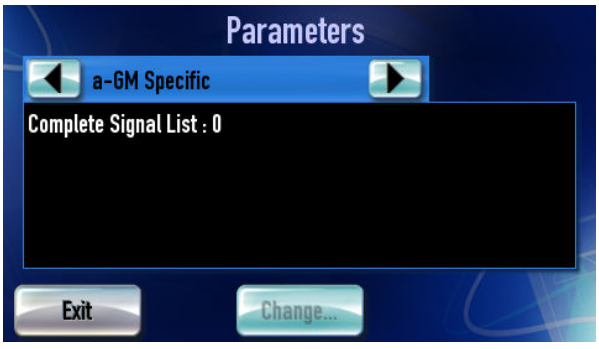
0: Most popular, Less parameters (Fast Scan)
1: Most popular+, More parameters (Medium Scan time)
2: Complete available data list (Long Scan time)



To change the level of parameters you will search for on an enhanced driver:

1. Make sure the enhanced driver is installed in the Device Manager, and a "Find Signals" procedure has been performed once.
2. From the Main Menu tap on [Setup], then [Devices], then [Parameters].
3. Use the [<] or [>] buttons at the top to find your enhanced driver.
4. Tap on [Complete Signal List] to highlight and tap [Change].
5. Enter a 1 or a 2 on the number pad.
6. Tap [Save], then [Exit].
7. Run "Find Signals' one more time to search the expanded list.

You will now be able to select and assign the new data in your gauges.



Parameters available for GM Specific

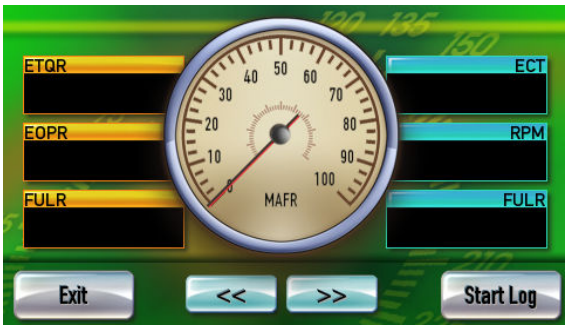
Increasing the number of signals that will be tested

DATA LOGGING

The DashDAQ can log and save all information represented on the gauges from the active screen. The information can be saved as a Microsoft Excel *.csv, or Logworks *.dif file directly to an inserted SD memory card.

To begin data logging:

1. Select a gauge layout from which to capture information. Assign signals to the gauges to data log.
2. Tap on [Start Log]. The signals will be saved to the SD card with a timestamp. The signals will continue to be displayed on the screen even as they are being saved to the card. Once a log has begun the gauge screen can not be changed.
3. To log signals you don't wish to put into a gauge review the Global Data Logger (pg 16).
4. Tap [End Log] when finished logging session. The data is now saved to the memory card.



Gauge screen with Start Log button in lower-right corner

Note: The DashDAQ records a few seconds of data before the [Start Log] button has been pressed. Therefore, log files may contain a negative timestamp. The amount of negative time varies by vehicle. The amount of negative time is dependant on the amount of data being logged. Newer vehicles offer more data, faster so they will have shorter negative time with more data.

Each time a data logging session is started and ended, DashDAQ saves one file to the SD memory card in a directory called "log." Each saved file has a log prefix. The default prefix is "log", and will be changed by a value of +1 as new logs are added. (ex log_001.csv)

To change the log prefix:

1. From the Main Menu, tap on [Data Logging].
2. Tap on [Log File Prefix]. This screen appears:
3. Type in the desired name of the log file prefix.
4. Tap [Save].

Entering the logfile prefix

Now all log files will be saved in numerical order with the prefix that was entered.

To view log files:

1. Remove the SD memory card from the DashDAQ.
2. Place the memory card into a SD card reader and attach to your PC.
3. Open the contents of the card. Log files are saved in the “logs” directory on the card. Log files may be opened in Microsoft Excel or any other spreadsheet program that accepts *.csv files. Logworks *.dif can be viewed in the Logworks program available from Innovate Motorsports for free at www.innovatemotorsports.com.

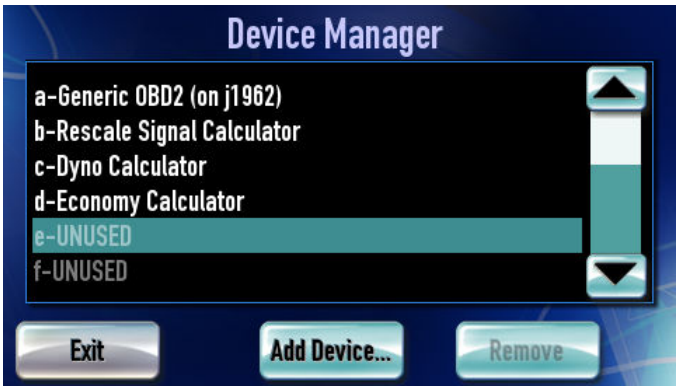
CALCULATORS

DashDAQ offers a variety of calculators that can be used to make custom signals using one or more input signals or using user defined values. These calculators come pre-installed on your DashDAQ.

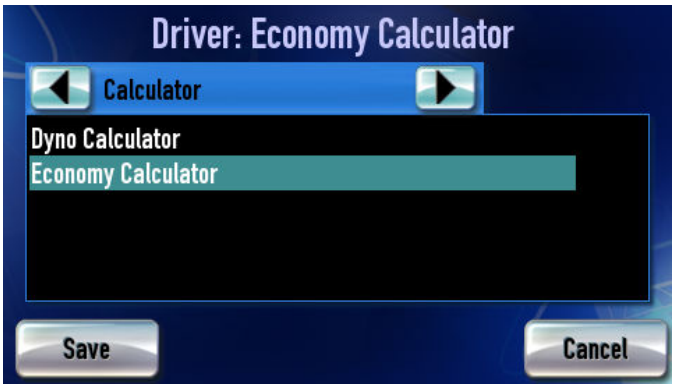
INSTALLING A CALCULATOR DRIVER

How to install the Fuel Economy calculator:

1. From the Main Menu tap [Setup] >> [Devices] >> [Manager]
2. In the Device Manager select an unused port, then tap [Add Device].
3. Use the [<<] or [>>] to locate the Calculator driver list. Select the driver you would like to install and tap [Install].
4. The calculator will then be added to the Device Manager list.



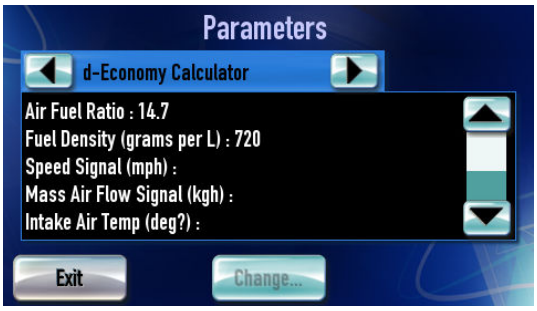
Selecting the next unused row



Configure the driver and assign it to a port

SETTING THE PARAMETERS FOR ANY CALCULATOR DRIVER

Some calculators will ask for user defined values such as vehicle weight, and fuel density. Others will require signals to be selected to complete the formula.



Parameters available for the Economy Calculator

To adjust a parameter for a driver:

1. From the main menu tap on [Setup].
2. Tap [Devices].
3. Tap [Parameters].
4. Use [<] or [>] buttons to the Navigate to the “d-Economy Calculator” option.
5. Select an input by tapping it. Select the signal input or the value you wish to enter.
6. Tap [Change]. Enter the number or text. Tap [Save] to confirm.
7. Repeat steps 1-4 until all inputs are satisfied.

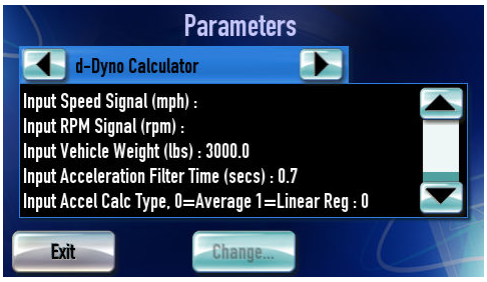
DYNO CALCULATOR

The driver generates two measurements that may be assigned to and logged by any gauge:

- **Calculated Horsepower**
- **Calculated Torque**

Values will be seen as Acceleration > 0, Deceleration < 0, Cruising speed near zero. This value ignores all external resistance factors and can be used for benchmarking vehicle performance before and after adding performance upgrades to the vehicle.

Install the Dyno Calculator following the steps found in the “installing a Calculator Driver” above.


Parameters
d-Dyno Calculator
Input Speed Signal (mph) :
Input RPM Signal (rpm) :
Input Vehicle Weight (lbs) : 3000.0
Input Acceleration Filter Time (secs) : 0.7
Input Accel Calc Type, 0=Average 1=Linear Reg : 0
Exit
Change...

Parameters for dyno calculator

Only three parameters are required for the calculation:

- **Input Speed Signal:** Choose Vehicle Speed from GenericOBD II or other Speed sensor input
- **Input RPM Signal:** Choose Engine RPM from GenericOBD II or other RPM sensor input
- **Input Vehicle Weight (lbs):** Enter the vehicle weight in pounds

The other parameters can usually be ignored, but you can try tuning the values for increased accuracy:

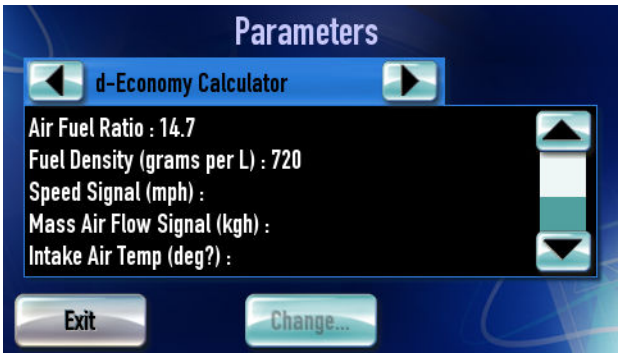
- **Input Acceleration Filter Time:**
- **Input Accel Calc Type:**
- **Input Speed Filter Constant:**

If you've assigned either statistic, to a gauge but you're not seeing values, double-check that you've assigned signals for both the Input Speed Signal and Input RPM Signal parameters. Also try assigning the input signals to a gauge to verify that DashDAQ is actually able to get a reading.

The calculated values will be available under "Dyno Calculator" when you assign signals to a gauge.

FUEL ECONOMY CALCULATOR

DashDAQ can calculate instantaneous fuel economy and display the results by calculated Mass Air Flow, distance (miles per gallon) or by time (gallons per hour).



Parameters for Economy Calculator

This calculator uses airflow to find the amount of fuel entering the motor. Vehicles with a Mass Air flow Sensor can measure airflow directly. You only need to configure four parameters:

- **Air Fuel Ratio:** 14.7 for gasoline
- **Fuel Density:** 720 for gasoline
- **Speed Signal:** Vehicle Speed from GenericOBD II or other Speed input signal
- **Mass Air Flow Signal:** Air Flow Rate from MAF from GenericOBD II or other MAF input signal

If the vehicle does not have a Mass Airflow sensor, this driver provides a way to estimate MAF based on additional vehicle variables. You additionally need to set:

- **Mass Air Flow Signal:** Calculated Mass Air flow from Economy Calculator
- **Intake Air Temperature:** Intake Air Temperature from GenericOBD II or other IAT sensor input
- **Manifold Pressure:** Manifold Absolute Pressure from GenericOBD II or other MAP sensor input
- **Engine Displacement:** Based on the motor, in liters. For example, 2.7 for some Dodge Chargers
- **Volumetric Efficiency:** Based on the motor. For example, enter 0.67 for 67% efficiency.

You can now assign the economy calculator values to a gauge (pg 13). Use the [<<] or [>>] buttons to select the signal from the Economy calculator signal list

Rescale Signal Calculator

Allows you to adjust a single signal or use multiple signals to create a custom signal for you to monitor and log. This provides the ultimate in flexibility because you can multiply two signals together, add/subtract two signals, multiply a signal by a constant value, etc.

The Rescale Calculator use a simple linear equation, Y= M * X + B, to configure custom user signals:

```
Output Signal = Input Signal * (Multiplier Signal or Constant Multiplier) + Offset Signal
```

Install the Rescale Signal Calculator following the steps found in the "installing a Calculator Driver" above.

This calculator can be installed several times; once for each signal that you wish to rescale. There required inputs are:

- **Input Signal:** Signal to modify. Pick a signal for speed, voltage, or any signal you want to rescale.
- **Multiplier Signal:** Either a vehicle signal, or "Constant Multiplier" described below.
- **Multiplier Sign**: Specify 1 to leave the multiplier unchanged, or -1 to make the multiplier negative.
- **Constant Multiplier:** Can be a positive or negative whole number or decimal and will be multiplied to the Input Signal. Leave as 1 if no multiplier is needed.
- **Offset Signal:** Either a vehicle signal or "Constant Offset" described below.
- **Offset Sign**: Specify 1 to leave the offset unchanged (add), or -1 to make the offset negative (subtract).
- **Constant Offset:** Can be a positive or negative whole number or decimal and will be added to the Input Signal. Leave blank if no Constant Offset is needed.

Additional Inputs:

- **Name:** Abbreviation to identify this signal. Used as a gauge label and displayed on the assign signals screen.
- **Units:** Physical units for the calculation. Any automatic Imperial/Metric occurs afterward. For example, if a calculation results in °C the number could be automatically converted to °F before display.
- **Precision:** Number of decimal digits to display. The more decimal places shown will cause the signal to change more often.

The calculated values will be available under "Rescale Signal Calculator" when you assign signals to a gauge.

EXAMPLE: CALCULATING BOOST

Many vehicles do not provide an enhanced signal for Turbo Boost but it's pretty easy to calculate. Boost is achieved when MAP pressure is greater than Barometric pressure.

This calculation looks like:

```
BOOST = MAP - BARO
```

To perform this calculation on the DashDAQ, try setting:

- **Input Signal:** Manifold Absolute Pressure from GenericOBD II or other MAP signal input
- **Multiplier Signal:** Constant Multiplier from Rescale Signal Calculator. Use [<] or [>] at the top to locate.
- **Multiplier Sign:** 1 (Positive).
- **Constant Multiplier:** 1.0.
- **Offset Signal:** Barometric Pressure from GenericOBD II or other BARO signal input. If no Barometric pressure signal available select Constant offset.
- **Offset Sign:** -1 (Subtract)
- **Constant Offset:** The current or average Baro pressure value for your region. (US avg. ~14.7)
- **Name:** Boost

You can now assign the economy calculator values to a gauge (pg 13). Use the [<<] or [>>] buttons to select the signal from the Rescale calculator signal list.

EXAMPLE: DISPLAYING RPM AS 0-8 INSTEAD OF 0-8000

Some people prefer a tachometer that displays RPM x1000 because the gauge face has fewer unnecessary zeroes and looks less cluttered. This calculation looks like:

```
Adjusted Tachometer = Engine RPM / 1000
```

To perform this calculation on the DashDAQ, try setting:

- **Input Signal:** Engine RPM from GenericOBD II or other RPM signal input
- **Multiplier Signal:** Constant Multiplier from Rescale Signal
- **Multiplier Sign:** 1 (Positive)
- **Constant Multiplier:** 0.001. Represents the divide-by-1000
- **Offset Signal:** Constant Multiplier from Rescale Signal
- **Constant Offset:** 0 to add/subtract nothing
- **Name:** RPM

You can now assign the economy calculator values to a gauge (pg 13). Use the [<<] or [>>] buttons to select the signal from the Rescale calculator signal list.

EXAMPLE: ADJUSTING VEHICLE SPEED FOR TIRE SIZE

If you changed tires from 185/60-14 to 195/55-14 and now the speedometer is incorrect, it is because you haven't reprogrammed the ECM. If you calculate the difference, there would be a -1.3% difference and you want to compensate for that on the speed gauge. This calculation looks like:

```
Adjusted Speed = Constant Multiplier * Vehicle Speed
Where the Constant Multiplier = 0.987 (1.3-1=.987)
```

To perform this calculation on the DashDAQ, try setting:

- **Input Signal:** Vehicle Speed from GenericOBD II or other Vehicle Speed signal input
- **Multiplier Signal:** Constant Multiplier from Rescale Signal Calculator
- **Multiplier Sign:** 1 (Positive)
- **Constant Multiplier:** 0.987. This represents 100% minus 1.3%.
- **Offset Signal:** Constant Offset from Rescale Signal Calculator
- **Constant Offset:** 0 to add/subtract nothing
- **Name:** Speed adj.

You can now assign the rescale calculator values to a gauge (pg 13). Use the [<<] or [>>] buttons to select the signal from the Rescale calculator signal list.

STATISTICS CALCULATOR (MIN / MAX / AVERAGE)

The statistics calculator allows you to monitor and log the minimum, maximum, or average value of a signal over a user defined period of time. This calculator can be useful if to smooth out a signal that has a lot of movement, or to view high or low points.

Install the Statistics Calculator following the steps found in the "installing a Calculator Driver" above.

This driver has a few parameters:

- **Input Signal:** Signal for this calculation.
- **Time to Average (s):** Seconds of historical data to use in the calculation. For example, specify “1.5” to average the past one-and-one-half seconds of data.
- **Name:** Abbreviation to identify this signal. Displayed on the assign signals screen.
- **Precision:** Number of decimal digits to display.

After configuring, you may choose among several calculations on the assign signals screen:

- **Minimum:** Smallest value during “time to average”
- **Maximum:** Largest value during “time to average”
- **Smoothed:** Average value during “time to average”. Using this signal with a small (1-2 second) time to average is a great way to filter signals that fluctuate wildly.

If you’ve assigned a statistic to a gauge but you’re not seeing values, double-check the Input Signal setting. Try assigning the input signal to a gauge to verify that the DashDAQ is able to get a reading.

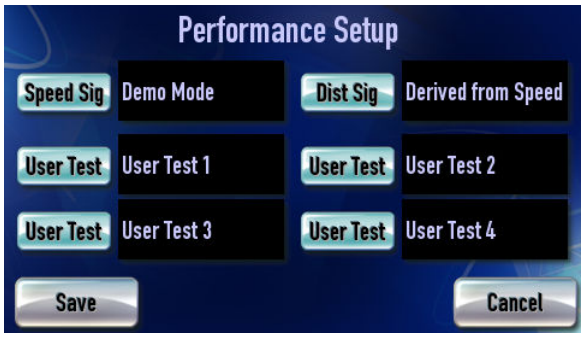
PERFORMANCE MEASUREMENTS

1/4-mile, 1/8-mile, 0-60mph times and many user-defined performance tests can be measured with DashDAQ Using only the speed signal input from OBD II or an external sensor.

1/4-MILE, 1/8-MILE, 0-60MPH TEST

From the Main Menu tap [Performance].

1. Tap on [Setup] then tap [Speed Sig] and locate and select the vehicle speed sensor.
2. Tap [Save].
3. The [Dist Sig] is self-calculated and is speed x time.

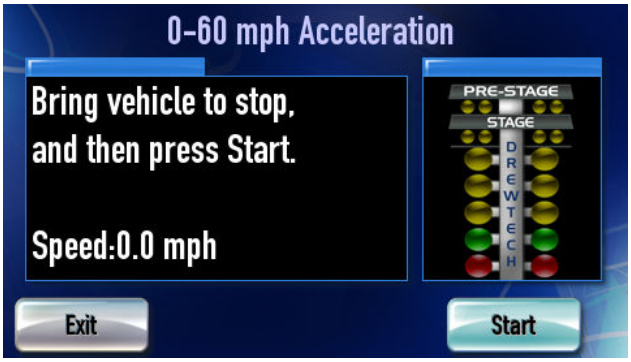


First specify the signals for speed and distance. You can use GenericOBD II, a standalone engine management system, or even a GPS

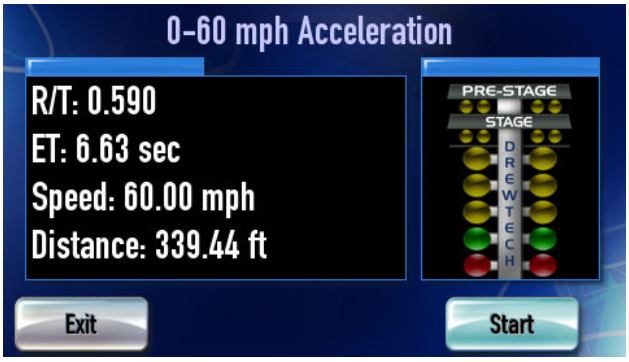
Next choose a speed-based or distance-based measurement

4. Tap [Save].
5. Tap [Acceleration Test].

Select the performance you would like to test by tapping on it.



Follow the instructions



DashDAQ will display your reaction time and other measurements

Tap [Start] to start the test. Results will be saved to the SD if installed.

Follow the on-screen instructions. The results will be posted in the left box at the end of the run.

USER DEFINED SPEED TESTS

Create your own performance tests. To set up a specific test:

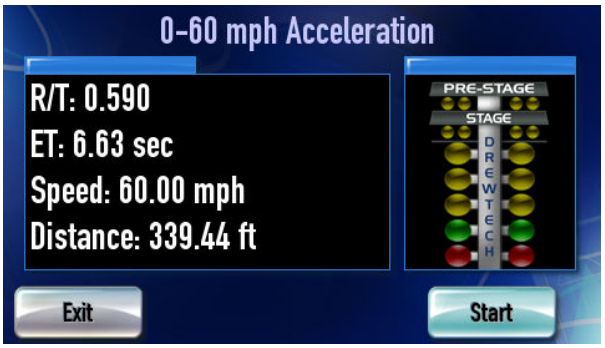
1. From the main menu tap on [Performance].
2. Tap on [Setup].
3. Tap on one of the four [User Test] buttons. The "Edit User Test" screen will appear.
4. Tap on [Name]. Enter the name of the test. Example: 0_to_120_feet

You can customize the start/stop distance or speed

DashDAQ has 4 user-configurable tests

5. Tap on [Units] to select a measurement unit. Example: feet
6. Tap on [Start] to set the start value of the measurement. Example: 0
7. Repeat steps 7 and 8 to set Units and Stop value. Example 120 feet.
8. Tap [Save]. Make sure the speed gauge is set and tap [save] once more.
9. At the performance menu, tap on [User Tests]. This screen appears:
10. Tap on [User Test 1].
11. Tap [Start] to start User 1's test.

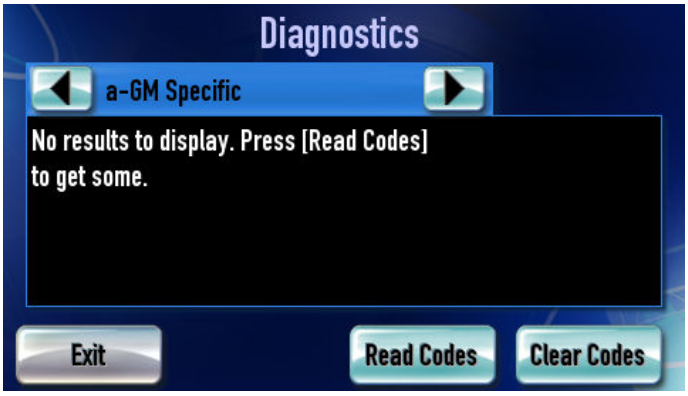
Follow the on-screen instructions. The results will be posted on-screen at the end of the run. Example of a results screen:



DIAGNOSTIC CODE READER

To view and clear diagnostic trouble codes:

From the Main Menu tap on [Diagnostics]. This screen will appear:



Diagnostics screen for reading trouble codes

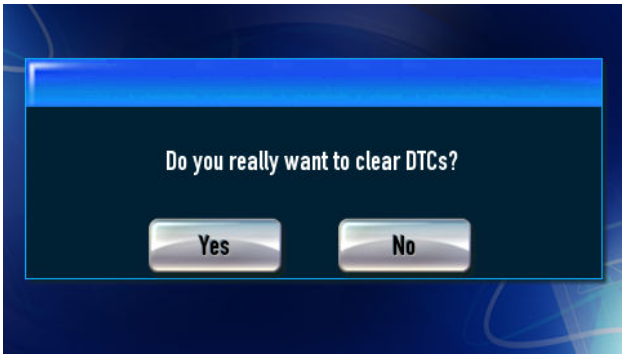
Note: Use the [<] and [>] buttons at the top to switch between Generic and Enhanced OEM information.

Turn the vehicle's key to the on position. The vehicle does not need to be running.

Tap [Read Codes]. If the vehicle's check engine light is on, diagnostic trouble code(s) (DTCs) will be displayed along with a short description of each code.

Fix the diagnosed problem, or make note of it.

To clear the diagnostic trouble codes, tap [Clear Codes]. You will be asked to confirm that you want to clear the codes.



Confirmation to clear diagnostic trouble codes

Note: Clearing codes does not solve any underlying vehicle issues.

Tap [Yes] to clear the code(s) and turn the check engine light off.

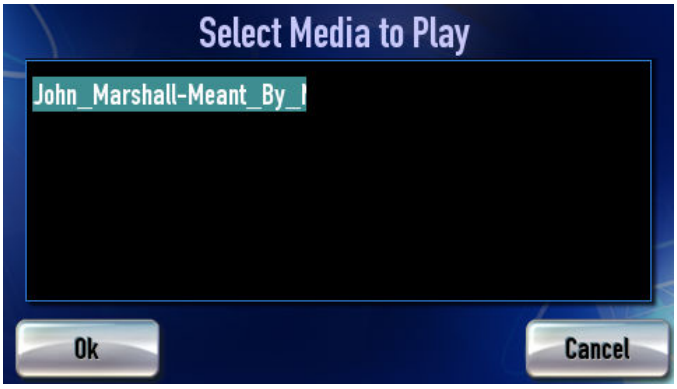
Tap [No] to leave the code(s) set and leave the check engine light on.

DASHDAQ MEDIA PLAYER

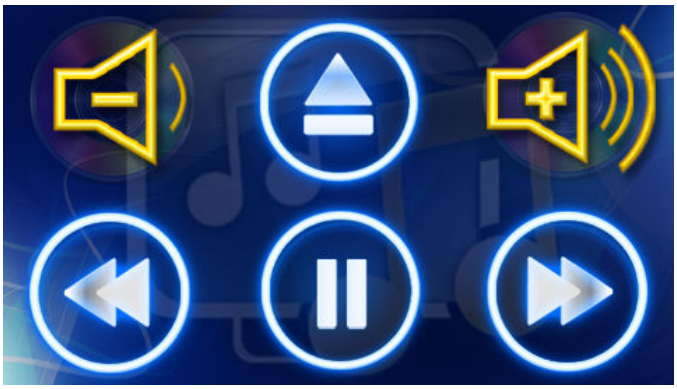
The DashDAQ has the ability to play a variety of sound and video files. The Media player is not pre-installed and will require the driver to be installed to the DashDAQ using the DashDAQ Recovery Tool. See "Updating DashDAQ" below for instructions. When updating using the Recover tool be sure to select the media player to install it to the DashDAQ.
To store and Playback audio/video files:

- Create Folder on SD card named "media" Must be on the root directory of the SD card.
- Video should be no bigger than 480x272 and be set to no more than 10 frames per second.

From the Main Menu tap [Entertainment].
The available media files will be shown in the "Select Media to Play"



The media you selected will now play. Notice you have general playback buttons. If you hit the eject button the media player will turn off and the Main Menu will reappear.



CUSTOMIZING YOUR DASHDAQ

INSTALLING FILES FROM SD CARD

Various files can be installed on to DashDAQ from the SD card. Themes, Splash Screens, Sounds, Config. File, and Licenses can all be installed this way. In order for DashDAQ to see these files when a SD card is inserted, the files must be contained in a folder called "transfer" in the parent directory of the SD card. A user can backup, install, uninstall files and format and eject a SD by navigating to: Main Menu>Setup>Memory Card.

CUSTOM SPLASH SCREEN

The DashDAQ allows users to change the splash screen (the graphic that is displayed when DashDAQ starts) to anything they wish. A user must first create a image file using image editing software. The image needs to be 480x272 and a .tga file. Most popular image editing programs can save in this format. To install and specify your splash screen after it has been created:

1. Place your splash screen on a SD card in a folder called "transfer."
2. Insert the SD card into the SD card slot and turn DashDAQ on.
3. From the Main Menu, tap on [Setup], then [Memory Card], then [Install], then [Splash Screen]. Select your image file. A confirmation of installation will be displayed.
4. Go back to the Main Menu and tap on [Setup], then [Display], then [Splash Screen]. Select your image.

When DashDAQ starts, your image will now be displayed before DashDAQ completely starts up.

CHANGING GAUGE THEMES

DashDAQ offers a wide variety of pre-installed themes that allow you to further customize your DashDAQ to your vehicle. These choices provide different gauge sets, colors, custom looks etc. You can also create your own custom theme and import it to DashDAQ using the DashDAQ Skin editor. Visit www.dashdaq.com for details.

5. From the Main Menu, tap [Setup]
6. Tap [Display].
7. Tap [Theme].
8. Select one of the themes listed, then tap [OK]. Your gauge screen will now have the new selected theme.

You will need to re-input the signal data for the new gauge displays.

ADJUSTING STANDARD/METRIC UNITS

DashDAQ offers the ability to automatically adjust a signal to the English standard or metric units.

To Change Units:

1. From the Main Menu tap [setup], [Display], [Units].
2. Select the Units you wish to use and select [Ok].
3. All signals will be adjusted to the selected unit of measure.

DISPLAY DIMMER/DISPLAY BRIGHTNESS

The DashDAQ has a built in light sensor that adjusts the screen brightness according to its surroundings. DashDAQ comes setup to automatically change the brightness of the screen; however, the automatic dimmer can be turned off or set to a specific brightness level.

1. Tap on [Setup] menu
2. Tap on [Display]
3. Tap on [Brightness]
4. Select the desired brightness level.

OFF / ON / LOW POWER MODE

The Off / On/ Low Power mode button is located on the front left corner of the DashDAQ. It has three functions:

- To shut off DashDAQ: Press the button and hold for 3 seconds. A screen will say "Shutting Down." The screen will go black. The DashDAQ is completely off.

  The DashDAQ has an automatic power down feature that shuts down the DashDAQ when the vehicle is turned off. This feature automatically shuts down the DashDAQ when no signals are observed from the OBD II connector.

  To enable Auto Power Off:

  1. Tap on [Setup] from the Main Menu.
  2. Tap on [Power].
  3. Tap on desired time for shutdown after key is turned off.
  4. Tap [Ok].

- To turn on DashDAQ: Press the power button again to power the DashDAQ back up.

- To put DashDAQ in Low Power Mode: Press and release the button quickly while the DashDAQ is on. The screen will go off, but the unit will still be on. Press the button again and the DashDAQ will instantly come back on. Low power mode saves power, but makes DashDAQ instantly available.

* Auto Power On is not available through the DashDAQ.

DEFAULT POWER-UP SCREEN

DashDAQ allows you to easily change which screen appears on initial power-up of the DashDAQ. This can help make it faster and easier to navigate through the DashDAQ to find the functions you use most.

5. From the Main Menu, tap [Setup].
6. Tap on [Display]
7. Tap on [Startup Page]
8. Choose the Page you would like to have be the startup page, then tap [OK]

The change will be seen the next time the DashDAQ is powered back on.

ANALOG INPUTS

DashDAQ has two analog inputs available on the accessory connector. They accept a 0-5v DC signal and are compatible with most automotive sensors. These signals can be displayed on the gauge screens along with any other input. They can be rescaled from the 0-5v scale into Fahrenheit, PSI, Air-Fuel ratios, or whatever the voltage represents. The analog inputs on DashDAQ have a 24.7 kilo ohm input impedance and may not be accurate when connected to a device with a high output impedance. For example, a narrowband O2 sensor output cannot be connected directly to a DashDAQ because the output impedance of the sensor is in the mega ohm range.

There are two drivers included with DashDAQ, the Linear Analog driver (Analog Input) and Non Linear Analog Driver (Non Linear Analog Input).

The Linear Driver is for measuring signals that have a constant input voltage change for a given change in what's being measured. An example is a sensor that has a 0.1V output change for every temperature degree it's measuring. 3 terminal sensors that have a voltage input, a voltage output, and ground are often linear sensors.

The Non Linear Driver is for measuring signals that do not have a constant input change for a given change in what's being measured. An example is a NTC (negative temperature coefficient) type resistive temperature sensor, which is very common in vehicles. The NTC temperature sensor will change resistance by a few ohms per degree at high temperatures and many thousands of ohms per degree at cold temperatures. 2 terminal resistive temperature sensors are usually non-linear.

The 10-pin DashDAQ accessory cable must be purchased to connect these sensors and is always available at www.dashdaq.com.

CONNECTIONS AND WIRING

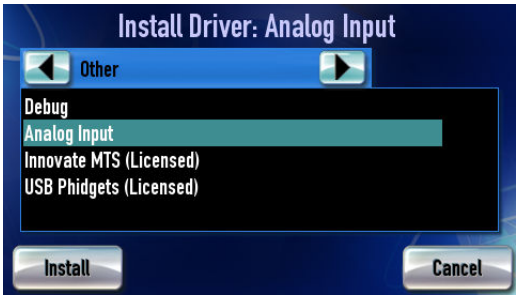
Connect the analog input signal you wish to measure to either Analog In 1 or Analog In 2 on the DashDAQ. See the end of this manual for the I/O cable wiring table.

LINEAR ANALOG INPUT DRIVER SETUP

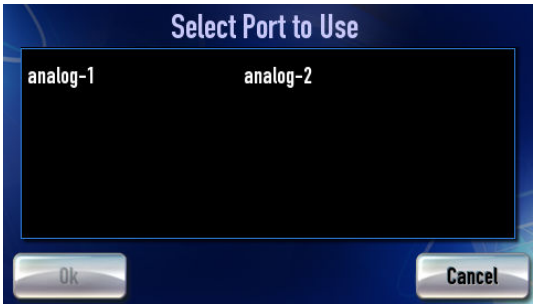
To setup an analog sensor in DashDAQ (sensor pre-wired to accessory cable assumed)

From the DashDAQ Main Menu tap on [Setup], then [Devices], then [Manager].

1. A DashDAQ typically comes in original packaging with analog sensors pre-populated in the Device Manager. If you do not see "Analog Input" in any of the driver slots (a-h) then tap on an empty slot and tap [Add Device].
2. Use the [<] or [>] buttons at the top to find the "Other" heading. Tap on [Analog Input] to highlight and tap [Install].
3. Select which port (analog-1 or analog-2) you would like to use.
4. Your analog sensor is now specified as a input in the Device Manager and can be assigned to any gauge to be viewed as voltage. To understand how to scale the signal to a specific unit see the next section.



DashDAQ comes preloaded with both Analog Inputs. If you needed to reinstall, you'd use Device Manager to install Analog Input in an available slot



Then you'd specify either Analog-1 or Analog-2. To read both, just load the driver twice in two different slots.

LINEAR ANALOG DRIVER CORRECTION FACTOR AND CORRECTION OFFSET

If you have an Innovate LC-1 wideband controller and you'd prefer to see an Air-Fuel ratio instead of a raw voltage. DashDAQ is able to convert a linear raw voltage signal into physical units using the following formula:

```
Corrected Value = Correction Factor * Raw Voltage + Correction Offset
```

This procedure will help you find values for Correction Factor and Correction Offset. The LC1-1's instruction manual says that its 0-5v analog output represents AFR=7.35 to AFR=22.39. With that information you can setup two equations:

```
(Correction Factor * 0v DC)+ Correction Offset = 7.35
(Correction Factor * 5v DC) + Correction Offset = 22.39
```

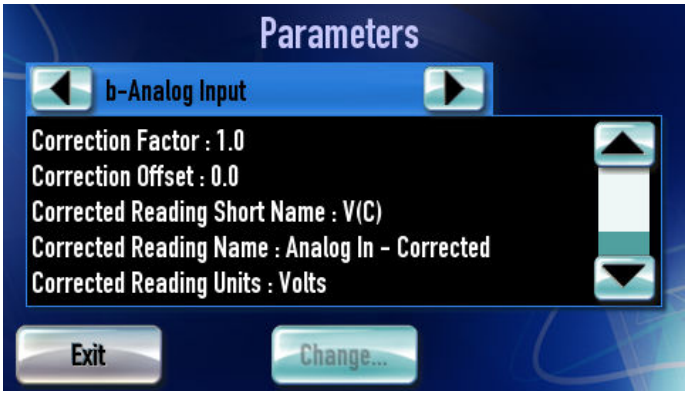
Using the correction factor 7.35, you solve the second equation and determine:

```
(Correction Factor * 5v DC) + 7.35 = 22.39 (subtract 7.35 from 22.39)
(Correction Factor * 5v DC) = 15.04 (divide 15.04 by 5)
(Correction Factor) = 3.008
```

With this procedure and two known-values, you can determine the Correction Factor and Correction Offset for most automotive sensors. Refer to the sensors user manual for Correction factor and offset values.

CONVERTING AN ANALOG VOLTAGE INTO PHYSICAL UNITS

Navigate to "Parameters" by tapping on [Setup] from the Main Menu, then [Devices], then [Parameters]. Use the arrows at the top to find the analog input you would like to scale.



Setting parameters for an analog input

These parameters are used when converting an analog signal into physical units:

- **Correction Factor:** Multiplier for the raw voltage.
- **Correction Offset:** Added to the raw voltage
- **Corrected Reading Name:** Abbreviation to identify corrected signal. Used as a gauge label and displayed on the assign signals screen.
- **Corrected Reading Units:** Physical units for the calculation. Any automatic Imperial/Metric occurs afterward. For example, if a calculation results in °C the number could be automatically converted to °F before display.
- **Corrected Reading Min:** Default minimum value; used for round gauges and graphs. You can override this for each gauge on the assign signals screen
- **Corrected Reading Max:** Default maximum value; used for round gauges and graphs. You can override this for each gauge on the assign signals screen.

NON LINEAR ANALOG INPUT DRIVER SETUP

To setup an analog sensor in DashDAQ (sensor pre-wired to accessory cable assumed)

From the Main Menu tap on [Setup], then [Devices], then [Manager].

1. Tap on an empty slot and tap [Change].
2. Use the [<] or [>] buttons at the top to find the “Other” heading. Tap on [Non Linear Analog Input] to highlight and tap [Save].
3. Now notice which port is specified on the change device screen. The black box next to the [Port] button contains a sensor number that should correspond to the number of the Analog Input that the sensor is connected to. If it does not tap the [Port] button once for the other analog input.
4. Tap [Save]. The analog sensor is now specified as an input in the Device Manager and can be assigned to any gauge to be viewed as voltage. To understand how to scale the signal to a specific unit see the next section.

NON LINEAR ANALOG INPUT CONFIGURATION

The Non Linear Driver is configured by the use of a configuration file. The nature of the configuration file will be covered in the next section. To configure the driver:

1. From the DashDAQ Main Menu tap on [Setup], then [Devices], then [Parameters].

2. Tap on the [<] or [>] until the letter for the Non Linear Driver being configured is shown.

3. Tap on a parameter to highlight it and tap on [Change] to change that parameter. The parameter meanings are as follows:

    - Conversion Data Filename: This is the name of the configuration file name. By default the file is named either “analog1.config” or “analog2.config”, depending on which port this driver is configured for. The file name root can be anything, but the suffix must be .config in order to install it.

    - Signal Name: This is the name that will show up on the gauge.

    - Units Name: This is the physcial units type (degC, kPA, PSI, etc). This will be displayed on the gauge if the gauge has enough room to display it in full. This is also used to do automatic English <-> Metric conversion. The units name must be exactly match one of DashDAQ’s standard units values in order for English <-> Metric conversion to work properly. The current units conversion set is shown in Appendix B.

NON LINEAR ANALOG INPUT DRIVER CONFIGURATION FILE

The analog inputs of DashDAQ have 10 bit A/D converters. This means that there's 1024 discrete readings possible on each A/D input. The actual input measuring range for the A/D converter is 0 to 5.035V in 1023 steps, with the 1024th step being anything over 5.035V, so each step is (5.035/1023), or approximately 0.00492 volts.

The configuration file consists of 1024 ascii numbers separated by any non numeric character except '.', '+', or '-'. Each number in the configuration file is what will be displayed for that voltage step on the input. For example, if you created a file that had the ascii numbers 1 to 1024 in it separated by spaces, for voltage inputs from 0-0.00492V the DashDAQ would display 1, for 0.00492-0.00984V the DashDAQ would display 2, continuing to 5.030V to 5.035V would display 1023, and finally 5.035V or greater would display 1024.

Given the DashDAQ input impedance of 24.7 Kohm and knowing the resistance or voltage output of a given sensor over the range that is to be measured, it's possible to create a configuration file for most resistive and amplified sensor types. The sensor setup options and calculations involved in creating the file are beyond the scope of this manual and will be covered in a separate application note.

Once an appropriate configuration file has been generated, it must be installed on DashDAQ from a SD card to be used. To install the configuration file:

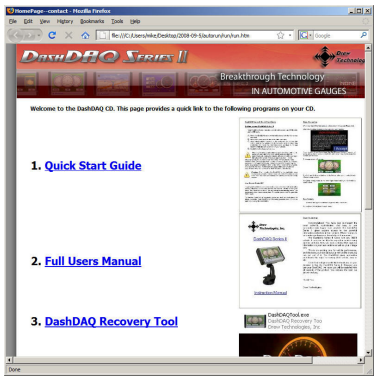
1. On a PC, insert a SD card into a card reader/writer in the PC, create a subdirectory called "transfer" on the SD card, and copy the configuration file to the transfer directory on the SD card. NOTE: the configuration file name must end in ".config".
2. Place the SD card into a powered off DashDAQ and then power it up.
3. From the DashDAQ Main Menu, tap on [Setup], then tap on [Memory Card], then tap on [Install], then tap on [Config File].
4. The configuration file should be shown on the Install screen. Highlight the configuration file by tapping on it and tap OK. A popup should indicate the file was installed successfully. Tap OK on the popup.
5. Configure the driver to use the installed file as described in the previous section.

UPDATING DASHDAQ

DashDAQ's software is field updateable. The software necessary to update the DashDAQ is on the included CD.

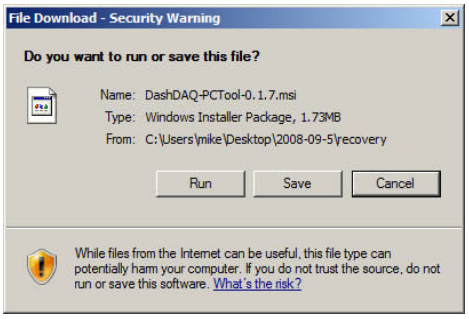
INSTALL THE DASHDAQ RECOVERY TOOL

DashDAQ comes with a CD that contains the DashDAQ update software. This auto run website will appear after inserting the CD in a computer:

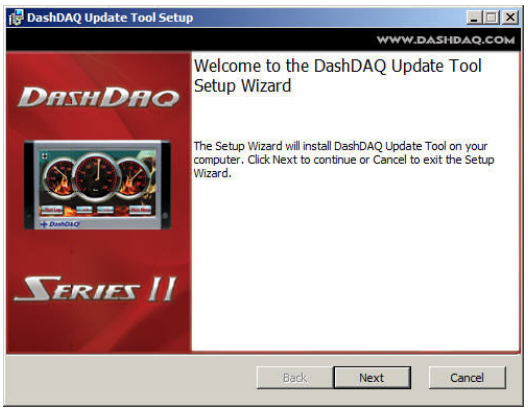

DashDAQ Series II
Breakthrough Technology
IN AUTOMOTIVE GAUGES
Welcome to the DashDAQ CD. This page provides a quick link to the following programs on your CD.
1. Quick Start Guide
2. Full Users Manual
3. DashDAQ Recovery Tool

Screen visible after inserting CD

1. Click on number 3, "DashDAQ Recovery Tool". This screen appears:

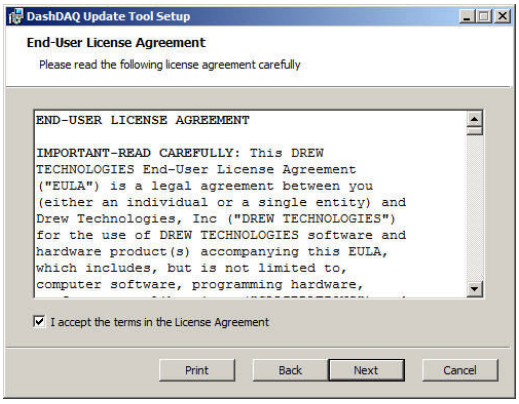
2. 
File Download - Security Warning
Do you want to run or save this file?
Name: DashDAQ-PCTool-0.1.7.msi
Type: Windows Installer Package, 1.73MB
From: C:\Users\mike\Desktop\2008-09-5\recovery
Run
Save
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?

3. Click on “Run.” If the ‘Run” option does not work, save this file (DashDAQ-PCTool-2.0.4.msi) to a memorable location and double click on it to run the DashDAQ Update Tool installer. This screen will appear next:

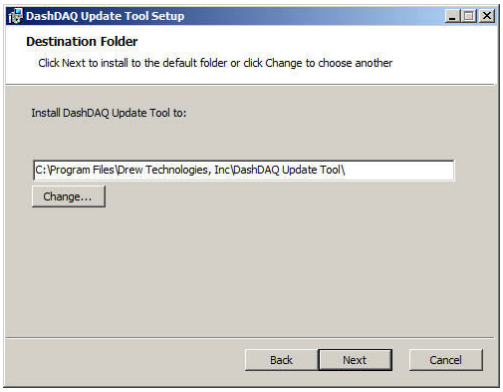

DashDAQ Update Tool Setup
WWW.DASHDAQ.COM
DASHDAQ
SERIES II
Welcome to the DashDAQ Update Tool Setup Wizard
The Setup Wizard will install DashDAQ Update Tool on your computer. Click Next to continue or Cancel to exit the Setup Wizard.
Back
Next
Cancel

4. Click “Next.”

5. Check the box by “I Accept the End-User License Agreement” if you agree to abide by the license agreement.


DashDAQ Update Tool Setup
End-User License Agreement
Please read the following license agreement carefully
END-USER LICENSE AGREEMENT
IMPORTANT-READ CAREFULLY: This DREW TECHNOLOGIES End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and Drew Technologies, Inc ("DREW TECHNOLOGIES") for the use of DREW TECHNOLOGIES software and hardware product(s) accompanying this EULA, which includes, but is not limited to, computer software, programming hardware,
I accept the terms in the License Agreement
Print
Back
Next
Cancel

6. Click “Next” to install DashDAQ into the specified directory.



7. Click “Install.” The DashDAQ Update Tool will now be installed to the computer. Click “Finish” when the installer has finished.

UPDATING DASHDAQ

WARNING: Do not power DashDAQ from the PC with the USB ports on the right. Permanent damage to your DashDAQ can occur.

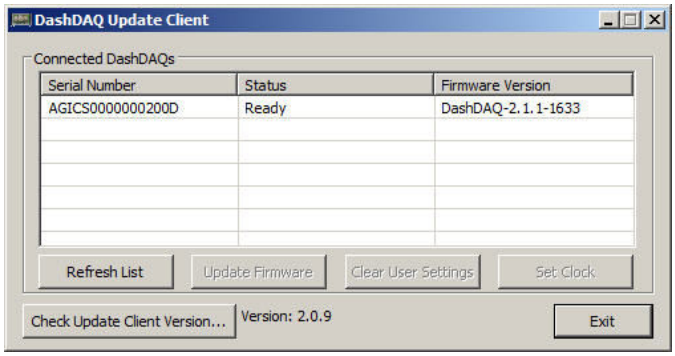
To update DashDAQ:

1. Establish an Internet connection on your computer. The DashDAQ Recovery Tools requires Internet access throughout the update process.

2. Connect the USB cable to the single USB port located on the **left** side of DashDAQ. Any other USB port will not work. Connect the opposite end of the USB cable to the computer’s USB port. **Note:** This USB port is used only for updating the DashDAQ.

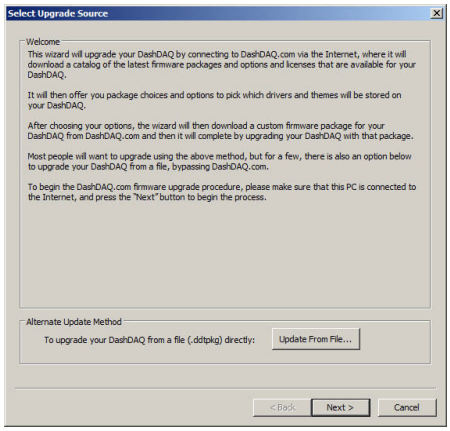
DashDAQ’s screen will display: “USB link established Boot Halted. You may now attempt to recover.” This message is normal.

3. On the computer Click on Start select Programs > Drew Technologies Inc. > DashDAQ Update Tool. This program starts:

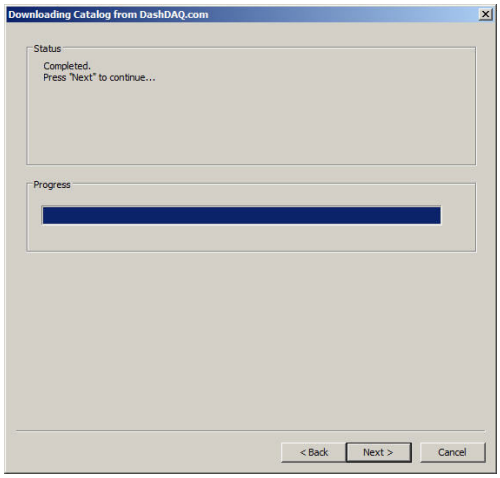


4. Click on your DashDAQ’s serial number to highlight.

5. Click “Update firmware.” This screen appears:

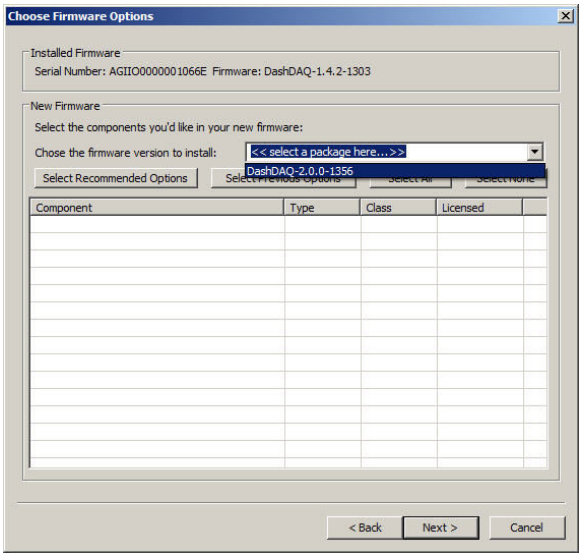

Select Upgrade Source
Welcome
This wizard will upgrade your DashDAQ by connecting to DashDAQ.com via the Internet, where it will download a catalog of the latest firmware packages and options and licenses that are available for your DashDAQ.
It will then offer you package choices and options to pick which drivers and themes will be stored on your DashDAQ.
After choosing your options, the wizard will then download a custom firmware package for your DashDAQ from DashDAQ.com and then it will complete by upgrading your DashDAQ with that package.
Most people will want to upgrade using the above method, but for a few, there is also an option below to upgrade your DashDAQ from a file, bypassing DashDAQ.com.
To begin the DashDAQ.com firmware upgrade procedure, please make sure that this PC is connected to the Internet, and press the "Next" button to begin the process.
Alternate Update Method
To upgrade your DashDAQ from a file (.ddtpkg) directly:
Update From File...
< Back
Next >
Cancel

6. Click “Next.” This screen appears:

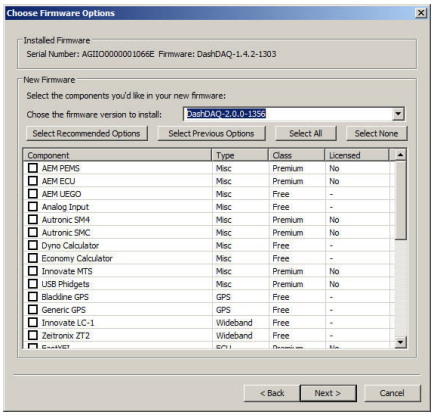


7. Click “Next.”

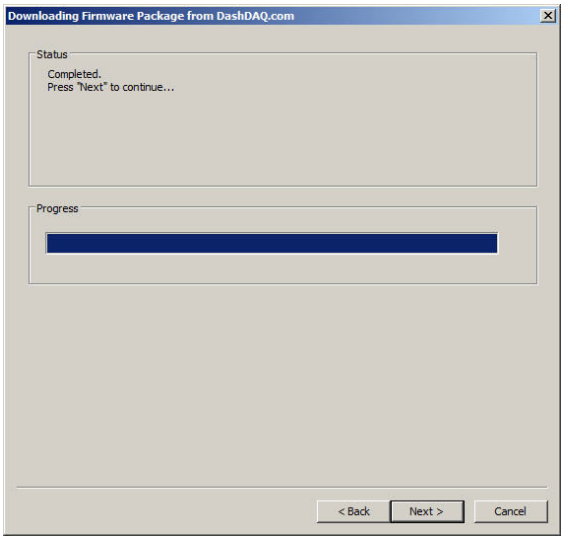
8. Use the drop down menu to select which firmware to install. For most users the most current firmware is the only option.



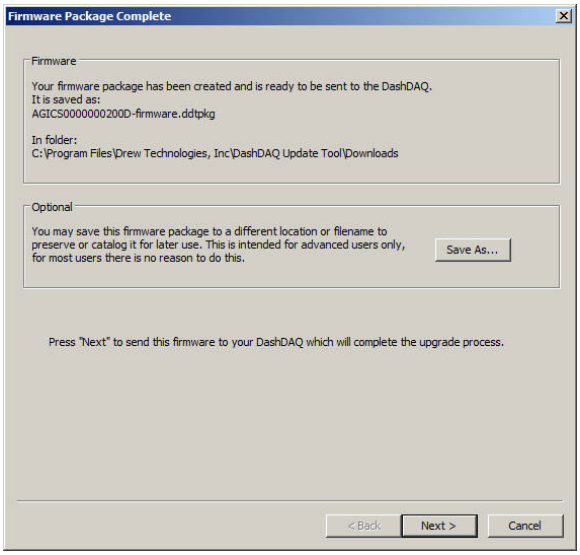
9. It is recommended to always to use the “select recommended options” button to always keep the factory base settings. You can then select additional components you would like to add, i.e. Purchased licenses.



Click [Next]. This screen appears:



10. Click “Next.” This screen appears:


Firmware Package Complete
Firmware
Your firmware package has been created and is ready to be sent to the DashDAQ.
It is saved as:
AGICS00000000200D-firmware.ddtpkg
In folder:
C:\Program Files\Drew Technologies, Inc\DashDAQ Update Tool\Downloads
Optional
You may save this firmware package to a different location or filename to preserve or catalog it for later use. This is intended for advanced users only, for most users there is no reason to do this.
Save As...
Press "Next" to send this firmware to your DashDAQ which will complete the upgrade process.
< Back
Next >
Cancel

Optional: To save the firmware package that was just created to the computer, click “Save As” under “Optional.” Firmware saved to the computer may be reloaded to DashDAQ in the future without Internet access.

11. Click [Next] to send the firmware to the DashDAQ. Wait. When DashDAQ has finished updating, the DashDAQ Recovery Tool will display the screen below. DashDAQ is now up to date!

Click [Finish] to close the Recovery Tool.

APPENDIX

SUPPORT

Before contacting us, check our online FAQs. Submit all support questions to www.dashdaq.com/forum. The forums are constantly monitored, and will provide you with the fastest answers.

TECHNICAL SPECIFICATIONS

Display	4.3” COLOR TFT w/touch panel
Resolution	480 x 272 (QWVGA) w 24-bit color display
System Processor	240MHZ ARM9
Vehicle Bus Processor	48MHZ ARM7
RAM	64MB SDRAM
Flash	16MB Flash
Memory Expansion	MMC/SD Card 128MB to 8GB+
Device I/O	touch-panel, ambient light sensor, 16-bit stereo line-out, 1W speaker, USB device port, programmable button
Vehicle I/O	CAN, J1850VPW (GM Class 2), J1850PWM (Ford SCP), ISO9141, KWP2000
Expansion I/O	(2) USB Host Ports, (2) RS232 Ports, (2) 0-5V 10-bit analog inputs, (1) 2.5mm Stereo output
Add-on sensors	Blackline GPS (up to 20HZ), 0-5V Wideband O2 Sensors, NMEA GPS, USB 3-axis Accelerometer, USB K-Type Thermocouple. See Third Party Accessories for complete list.
Operating temperature	-35 to 85C
Operating voltage	6 to 30V
Current Draw	200mA at 100% backlight
Dimensions	4.6” x 2.75” x 1”
Weight	0.5LB
Operating System	Linux
Warranty	factory tested with 1 year warranty
Other Features	Real Time Clock, locking connectors, factory tested, field upgradeable firmware
Mounting Pattern	AMPS 4-HOLE standard
Package Contents	DashDAQ, Vehicle Cable, USB Cable, Windshield Pedestal, CD-ROM, Quick Start Guide

APPENDIX A: ACCESSORY CABLE PIN OUT

1	Red	Vehicle Power In/Out	If DashDAQ is connected via OBD II cable, this is the source for vehicle power. If OBD II is not connected, vehicle power must be applied here. Warning! Do not attempt to power any device from this output that draws more that 500ma of current. Failure to observe this restriction could result in permanent un-repairable damage to your DashDAQ.
2	Orange	Serial Port 1 Rx	Connect to pin 3 of PC DB-9
3	Yellow	Serial Port 2 Tx	Connect to pin 2 of PC DB-9
4	Blue	Serial Port 2 Rx	Connect to pin 3 of PC DB-9
5	Brown	Serial Port 1 Tx	Connect to pin 2 of PC DB-9
6	Black	Case Ground	1Meg Ohm to Gnd. For cable shielding. Do not use as a Ground.
7	White	Analog input 2	0.0 to 5.0 Volt input
8	Pink	5V @ 500ma Output	Resettable fuse protected.
9	Green	Analog input 1	0.0 to 5.0 Volt input
10	Shield	Ground	This is the signal ground. Connect to pin 5 of PC DB-9

Note: For future compatibility tie 6 and 10 together.

APPENDIX B: CAN EXPANSION CABLE PIN OUT

	Color	Function	J1962 Pin #
1	Black	J1850-	10
2	Brown	J1850+	2
3	Red	ISO-L Line	15
4	Orange	Unswitched Power	16
5	Yellow	ISO-K Line	7
6	Green	CAN-L	14
7	White	CAN-H	6
8	Blue	Signal Ground	5

APPENDIX C: ENGLISH TO METRIC CONVERSION UNIT NAMES

Conversion Type	English Unit Name	Metric Unit Name
Temperature	degF or °F	degC or °C
Speed	MPH	KPH
Distance	miles	km
Fuel Economy	MPG	L/100km
Fuel Consumption	Gph	lph
Pressure	psi	kpa
Pressure	psi	mbar
Pressure	In Hg/PSI	mmHg/BAR
Flow Rate	lb/min	g/s or g/sec or gm/sec
Flow Rate	lb/hr	kg/hr
Weight	lbs	kg
Volume	gal	L

APPENDIX D: GPS NAVIGATION SETUP-DISCONTINUED

The DashDAQ can be purchased with or without GPS navigation. If a DashDAQ is purchased without GPS navigation, the GPS navigation kit can be purchased separately.

If you purchased a DashDAQ along with a GPS kit:

1. Insert the navigation SD card.
2. Connect the antenna cable to DashDAQ, and place the antenna on your vehicle dashboard for signal reception.
3. Turn on your DashDAQ and tap on the [GPS Navigation] icon.

DashDAQ main menu with GPS option

If your GPS kit is purchased separately:

1. When ordering the GPS-NAV-KIT at DashDAQ.com or through any other vendor, make sure you send the serial number of your unit with the order ticket. This is how your unit becomes licensed for the GPS software.
2. Before your kit arrives you will get a notice E-mail that your DashDAQ has been licensed for GPS navigation.
3. Update your DashDAQ with the DashDAQ Recovery Tool
4. Update your DashDAQ even if it has the latest software. Make sure to pick all of the drivers that you currently use on the DashDAQ. When a particular DashDAQ is licensed for GPS Navigation, the license is automatically installed in the DashDAQ when an update is performed.
5. After your unit has been updated, insert the navigation SD card.
6. Connect the antenna cable to DashDAQ, and place the antenna on your vehicle dashboard for signal reception.
7. Turn on your DashDAQ and tap on the GPS icon.

LIMITED WARRANTY

Drew Technologies, Inc. guarantees that every DashDAQ XL is free from physical defects in material and workmanship under normal use for one year from the date of purchase. Warranty card must be mailed within 90 days of initial purchase to activate warranty. If the product proves defective during this warranty period, email Drew Technologies Customer Support (support@drewtech.com) in order to obtain a Return Authorization number and form. When returning a product, mark the Return Authorization number clearly on the outside of the package and include a copy of your original proof of purchase and the form.

IN NO EVENT SHALL DREW TECHNOLOGIES, INC.' LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION.

Drew Technologies, Inc. makes no warranty or representation, expressed, implied, or statutory, with respect to its products or the contents or use of this documentation and all accompanying software, and specifically disclaims its quality, performance, merchantability, or fitness for any particular purpose. Drew Technologies, Inc. reserves the right to revise or update its products, software, or documentation without obligation to notify any individual or entity. Please direct all inquiries to:

Drew Technologies, Inc.
3915 Research Park Dr
Suite A10
Ann Arbor, MI 48108
Phone: (734) 222-5228
Fax: (734) 222-5008
E-Mail: support@drewtech.com

Warranty is void if software that has not been authorized by Drew Technologies, Inc. is installed and/or run on the DashDAQ.

Warranty is void if the DashDAQ case is opened.

Warranty is void if DashDAQ is used in a manner not consistent with reasonable care.